Validation of Names at Subspecific Rank in North American Campanulaceae

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Abstract. Thirteen combinations at subspecific rank are effected for North American Campanulaceae, in preparation for a forthcoming world checklist of the family. Twelve were recognized most recently at varietal rank within the same species to which they are here assigned: *Diastatea virgata* subsp. *ciliata* (McVaugh) Lammers, *Githopsis diffusa* subsp. *guadalupensis* (Morin) Lammers, *Heterotoma lobelioides* subsp. *glabra* (T. J. Ayers) Lammers, *Lobelia assurgens* subsp. *santa-clarae* (McVaugh) Lammers, *Lobelia berlandieri* subsp. *brachypoda* (A. Gray) Lammers, *Lobelia ehrenbergii* subsp. *gracilens* (A. Gray) Lammers, *Lobelia flexuosa* subsp. *intermedia* (Hemsley) Lammers, *Lobelia gruina* subsp. *peduncularis* (McVaugh) Lammers, *Lobelia irasuensis* subsp. *fucata* (McVaugh) Lammers, *Lobelia irasuensis* subsp. *picta* (B. L. Robinson & Seaton) Lammers, *Palmerella debilis* subsp. *serrata* (A. Gray) Lammers, and *Triodanis perfoliata* subsp. *biflora* (Ruiz & Pavón) Lammers. *Downingia humilis* Greene has been recognized as a distinct species or subsumed without recognition into *D. pusilla* (G. Don ex A. DC.) Torrey; however, its pattern of variation makes its recognition as *Downingia pusilla* subsp. *humilis* (Greene) Lammers more appropriate.

Key words: Campanulaceae, *Diastatea*, *Downingia*, *Githopsis*, *Heterotoma*, *Lobelia*, *Palmerella*, *Triodanis*.

Work is drawing to a close on a checklist of the world's species of Campanulaceae Jussieu (sensu Lammers, 1998a, in press). In preparing this manuscript, numerous species were encountered that did not have a legitimate name in the genus and rank to which I thought they should be assigned. In some cases, this was due to problems of unrecognized priority; in others, it was because of revised generic circumscriptions. All these problems at specific rank were rectified in a series of six precursor papers (Lammers, 1995, 1998b, 1999a, 1999b, 2001; Serra et al., 1999).

There remain a few infraspecific taxa that merit recognition, but which similarly lack a legitimate name at the rank to which they should be assigned. In my opinion, the only infraspecific taxon that merits recognition is a group of conspecific populations that is not only morphologically distinguishable from other such groups, but is also geographically coherent in some fashion, typically allopatric or parapatric. Such groups are not as clearly demarcated as congeneric species, often showing intergradation in a zone of contact. Infraspecific groups that meet these criteria have consistently been ranked as subspecies in my research (e.g., Lammers, 1988, 1991, 1999b, 2004, 2005).

In order to maintain this consistency, 13 taxa (all native to North America) are here provided with names at subspecific rank; all meet my criteria outlined above. Of these, the single *Downingia* has been treated as a distinct species by some authors, but not distinguished at all by others. The rest have been treated in their most recent monographs at varietal rank in the species to which they are assigned here. As such, I basically am accepting the classifications in these monographs (cited as appropriate under each entry), with a simple change of rank. All of my statements regarding geographic distribution are derived from these same monographs.

Diastatea virgata subsp. **ciliata** (McVaugh) Lammers, stat. nov. Basionym: *Diastatea virgata* var. *ciliata* McVaugh, Bull. Torrey Bot. Club 67: 793. 1940. TYPE: Mexico. Guerrero: mountains above Iguala, limestone ledges, 24 Oct. 1900, *Pringle 8375* (holotype, GH; isotypes, F, G-DEL not seen, GOET not seen, ISC, NY, PH not seen, POM not seen, RM not seen, S not seen, US not seen).

Diastatea virgata Scheidweiler is endemic to southern Mexico; subspecies *virgata* is restricted to Oaxaca and Vera Cruz, while subspecies *ciliata* occurs farther north, in Michoacán, México, Morelos, and Guerrero (McVaugh, 1940a, 1943). They may be distinguished using McVaugh's (1940a, 1943) key to varieties.

Downingia pusilla subsp. **humilis** (Greene) Lammers, comb. et stat. nov. Basionym: *Bolelia humilis* Greene, Pittonia 2: 226. 1892. *Downingia humilis* (Greene) Rattan, Anal. Key West Coast Bot. (ed. 3): 47. 1898. TYPE: U.S.A. California: Sonoma Co., 1892, *Bioletti s.n.* (holotype, NDG-052519)

As circumscribed by McVaugh (1941, 1943) and Ayers (1993a), *Downingia pusilla* (G. Don ex A. DC.) Torrey is a species distributed amphitropically in the western United States (California) and southern South America (Chile and Argentina); these authors included *D. humilis* as a synonym, following Hoover (1940). Weiler (1962), however, found suites of morphological features by which the two could be distinguished. Weiler accorded these two groups specific rank, but did note the existence of intermediate specimens where their ranges approach one another in central Chile. This indicates to me that it is more appropriate to treat them as conspecific subspecies. They may be distinguished using the following key:

1a. Longest calyx lobe 4.4–8.3 mm long; mature hypanthium 13–35 mm long with tough rigid wall, any seed impressions obscure (Central Valley of California; Valparaíso, Colchagua, Ñuble, and Concepción provinces in north central Chile) . . . . . *D. pusilla* subsp. *humilis*

1b. Longest calyx lobe 2.5–4.4 mm long; mature hypanthium 5–12 mm long with thin papery wall, seed impressions obvious (Bío Bío and Valdivia provinces in south central Chile; Neuquen, Chubut, Río Negro, and Santa Cruz provinces in southern Argentina) . . . . . *D. pusilla* subsp. *pusilla*

Githopsis diffusa subsp. **guadalupensis** (Morin) Lammers, stat. nov. Basionym: *Githopsis diffusa* var. *guadalupensis* Morin, Syst. Bot. 8: 464. 1983. TYPE: Mexico. Baja California Norte: Guadalupe Island, 1857, *Palmer 53* (holotype, BM not seen; isotypes, GH, MO not seen, NO not seen, PH not seen, YU not seen).

Githopsis diffusa A. Gray is endemic to the western United States (California) and adjacent Mexico. Morin (1983, 1993) divided it into four subspecies (from north to south): *robusta* Morin (southern Cascade Mountains, northern Sierra Nevada, and North Coast ranges in California); *diffusa* (South Coast ranges in California to northern Baja California Norte in Mexico); *filicaulis* (Ewan) Morin (scattered localities in Riverside and San Diego Counties in California); and *candida* (Ewan) Morin. The last subspecies was divided by Morin into two allopatric varieties: *candida* (Ewan) Morin for populations in the Cuyamaca and Palomar Mountains of San Diego Co. in California, and *guadalupensis* Morin for populations on the Mexican island of Guadalupe. It is not clear why this approach was taken. Morin admits (1983: 451) that it is a very different case from her only other use of varietal rank in the genus (to denote "local populations scattered throughout the range of a species or subspecies"), but does not justify this variance from her own practice. Based on the morphological differences given in her key and the taxon's insular endemism, I find it more consistent to treat the plants on Guadalupe as a subspecies coordinate with the other four.

Heterotoma lobelioides subsp. **glabra** (T. J. Ayers) Lammers, stat. nov. Basionym: *Heterotoma lobelioides* var. *glabra* T. J. Ayers, Syst. Bot. 15: 311. 1990. TYPE: Mexico. San Luis Potosí: in mountains near Santa Maria del Rio, Aug. 1876, *Schaffner 736* (holotype, GH not seen; isotype, US not seen).

Heterotoma lobelioides Zuccarini is widely distributed in Mexico and Central America; subspecies *lobelioides* is widely distributed in the Sierra Madre del Sur of western Mexico, from Michoacán to Oaxaca, and on isolated volcanoes from Chiapas to Costa Rica, while subspecies *glabra* is parapatric on the north of that range, occurring in San Luis Potosí, as well as in Guerrero, Jalisco, and Mexico (Ayers, 1990). They may be distinguished using Ayers's (1990) key to varieties.

Lobelia assurgens subsp. **santa-clarae** (McVaugh) Lammers, stat. nov. Basionym: *Lobelia assurgens* var. *santa-clarae* McVaugh, N. Amer. Fl. 32A: 84. 1943. TYPE: Cuba. Trinidad Mts., Santa Clara (Las Villas), *Britton & Wilson 5331* (holotype, NY not seen).

Lobelia assurgens L. is endemic to the Greater Antilles; subspecies *assurgens* is endemic to Jamaica, while subspecies *santa-clarae* is found on Cuba and Hispaniola (McVaugh, 1943). They may be distinguished using McVaugh's (1943) key to varieties, after noting that he used the name *L. assurgens* var. *jamaicensis* Urban for what now must be known by the autonym *L. assurgens* subsp. *assurgens*.

Lobelia berlandieri subsp. **brachypoda** (A. Gray) Lammers, stat. nov. Basionym: *Lobelia cliffortiana* var. *brachypoda* A. Gray, Syn. Fl. N. Amer. 2(1): 7. 1878. *Lobelia brachypoda* (A. Gray) Small, Fl. S.E. U.S. 1147. 1903. *Lobelia berlandieri* var. *brachypoda* (A. Gray) McVaugh, Bartonia 23: 40. 1945. TYPE: U.S.A. Texas: "Collected in Expedition from Western Texas to El Paso, New Mexico," May–Oct. 1849, *Wright 419* (lectotype, designated by McVaugh, 1945a: 40, GH; isotype, NY).

McVaugh (1940b, 1943) originally treated *L. brachypoda* and *L. berlandieri* A. DC. as distinct species with parapatric ranges in northeastern Mexico and the adjacent U.S.A. (Texas). Subsequently (McVaugh, 1945a, 1951), he determined that a great number of specimens from their zone of contact were intermediate in morphology and treated the two as conspecific varieties. The situation he described is exactly the sort for which I prefer to use subspecific rank. The two may be distinguished with the following key:

1a. Fruiting pedicels (10–)12–25(–70) mm long, spreading, apex strongly incurved and capsule thereby facing stem; calyx lobes glabrous (Tamaulipas, Nueva León, and San Luis Potosí). . . . . *D. berlandieri* subsp. *berlandieri*.

1b. Fruiting pedicels 4–10(–12) mm long, strongly ascending, apex little or not at all incurved and capsule thereby erect; calyx lobes ciliate near apex (southern Texas to eastern Chihuahua and northern Tamaulipas) . . . . . *D. berlandieri* subsp. *brachypoda*.

Lobelia ehrenbergii subsp. **gracilens** (A. Gray) Lammers, stat. nov. Basionym: *Lobelia gracilens* A. Gray, Proc. Amer. Acad. Arts 21: 393. 1886. *Lobelia ehrenbergii* var. *gracilens* (A. Gray) McVaugh, Amer. Midl. Naturalist 24: 695. 1940. TYPE: Mexico. Southwestern Chihuahua, Aug.–Nov. 1885, *Palmer 360* (holotype, GH; isotypes, NY[2]).

Lobelia ehrenbergii Vatke is endemic to northern Mexico; subspecies *ehrenbergii* is found in Nuevo León, Tamaulipas, San Luis Potosí, and Hidalgo, while subspecies *gracilens* occurs disjunctly in western Chihuahua and adjacent Durango (McVaugh, 1943). They may be distinguished using McVaugh's (1943) key to varieties.

Lobelia flexuosa subsp. **intermedia** (Hemsley) Lammers, stat. nov. Basionym: *Heterotoma intermedia* Hemsley, Biol. Cent.-Amer., Bot. 2: 269. 1881. *Heterotoma cordifolia* var. *intermedia* (Hemsley) F. E. Wimmer, Pflanzenr. IV. 276b: 717. 1953. *Lobelia flexuosa* var. *intermedia* (Hemsley) T. J. Ayers, Syst. Bot. 15: 321. 1990. *Calcaratolobelia flexuosa* var. *intermedia* (Hemsley) Wilbur, Sida 17: 563. 1997. TYPE: Mexico. 1850, *Seemann 2051* (holotype, K not seen; isotype, BM not seen).

Lobelia flexuosa (C. Presl) A. DC. is endemic to western Mexico; subspecies *flexuosa* occurs in Nayarit, Jalisco, and Oaxaca, while subspecies *intermedia* is found north of that range in southwestern Durango (Ayers, 1990). They may be distinguished using Ayers's (1990) key to varieties.

Lobelia gruina subsp. **peduncularis** (McVaugh) Lammers, stat. nov. Basionym: *Lobelia gruina* var. *peduncularis* McVaugh, Amer. Midl. Naturalist 24: 687. 1940. TYPE: Mexico. Oaxaca: Sierra de San Felipe, 13 Oct. 1894, *Pringle 5688* (holotype, GH).

Lobelia gruina Cavanilles is endemic to Mexico; subspecies *gruina* is found from Durango and Nuevo León to Oaxaca, while subspecies *peduncularis* occurs in Guerrero and Oaxaca (McVaugh, 1943). They may be distinguished using McVaugh's (1943) key to varieties, after noting that he used the name *L. gruina* var. *conferta* Fernald for what now must be known by the autonym *L. gruina* subsp. *gruina*.

Lobelia irasuensis subsp. **fucata** (McVaugh) Lammers, stat. nov. Basionym: *Lobelia irasuensis* var. *fucata* McVaugh, Amer. Midl. Naturalist 24: 697. 1940. TYPE: Mexico. Durango: Dos Cajetes, ca. 30 mi. W of Durango, 3 Nov. 1896, *Palmer 817* (holotype, GH).

Lobelia irasuensis subsp. **picta** (B. L. Robinson & Seaton) Lammers, stat. nov. Basionym: *Lobelia picta* B. L. Robinson & Seaton, Proc. Amer. Acad. Arts 28: 112. 1893. *Lobelia irasuensis* var. *picta* (B. L. Robinson & Seaton) McVaugh, Amer. Midl. Naturalist 24: 697. 1940. TYPE: Mexico. México: Sierra de las Cruces, cold springy meadows, 1 Oct. 1892, *Pringle 4305* (holotype, GH; isotypes, MU, NY).

Lobelia irasuensis Planchon & Oersted is widespread in Mexico and Central America (McVaugh, 1943). Subspecies *irasuensis* is endemic to Central America, occurring in the mountains of Costa Rica and western Panama (Wilbur, 1977). The other two occur farther north, in Mexico; subspecies *picta* is endemic to the Eje Volcánica Transversal in the states of México and Michoacán, while subspecies *fucata* occurs in Aguascalientes, Durango, Guanajuato, Jalisco, Sinaloa, and Zacatecas (Rzedowski & Calderón de Rzedowski, 1997). They may be distinguished using McVaugh's (1943) key to varieties.

Palmerella debilis subsp. **serrata** (A. Gray) Lammers, stat. nov. Basionym: *Palmerella debilis* var. *serrata* A. Gray, in S. Watson, Bot. California 1: 620. 1876. *Lobelia rothrockii* Greene, Pittonia 1: 297. 1889; non *Lobelia serrata* Meyen, Reise 1: 300. 1834. *Laurentia debilis* var. *serrata* (A. Gray) McVaugh, Bull. Torrey Bot. Club 67: 144. 1940. *Lobelia dunnii* var. *serrata* (A. Gray) McVaugh, Bull. Torrey Bot. Club 67: 795. 1940. TYPE: U.S.A. California: Ojai Ck. valley, July 1875, *Rothrock 173* (holotype, GH; isotypes, F, NY).

Palmerella debilis A. Gray is endemic to the western United States (California) and adjacent Mexico; subspecies *debilis* is endemic to the Sierra Juárez and Sierra San Pedro Mártir of northern Baja California Norte in Mexico, while subspecies *serrata* occurs in the Outer South Coast Ranges, Transverse Ranges, and San Jacinto Mountains of southern California and the northern Sierra Juárez of northern Baja California Norte (McVaugh, 1940a, 1943; Wiggins, 1980; Ayers, 1993b). They may be distinguished using McVaugh's (1943) or Wiggins's (1980) key to varieties, after noting that they assigned this species to *Lobelia* under the homotypic name *L. dunnii* Greene.

Triodanis perfoliata subsp. **biflora** (Ruiz & Pavón) Lammers, stat. nov. Basionym: *Campanula biflora* Ruiz & Pavón, Fl. Peruv. 2: 55. 1799. *Specularia biflora* (Ruiz & Pavón) Fischer & C. A. Meyer, Index Sem. Hort. Petrop. 2: 22. 1836. *Pentagonia biflora* (Ruiz & Pavón) Kuntze, Revis. Gen. Pl. 2: 381. 1891. *Legousia biflora* (Ruiz & Pavón) Britton, Mem. Torrey Bot. Club 5: 309. 1894. *Triodanis biflora* (Ruiz & Pavón) Greene, Man. Bot. San Francisco: 230. 1894. *Triodanis perfoliata* var. *biflora* (Ruiz & Pavón) T. R. Bradley, Brittonia 27: 114. 1975. TYPE: Peru, *Ruiz & Pavón s.n* (holotype, MA not seen; photo, F).

Bradley (1975) presented detailed data from experimental hybridization and morphometric studies, which supported the view that *Triodanis perfoliata* (L.) Nieuwland and *T. biflora* (Ruiz & Pavón) Greene represent two sets of populations that are incompletely isolated reproductively. As a result, plants of intermediate morphology are common in areas of sympatry. Although their geographic distributions overlap considerably (see McVaugh, 1945b, for details), it seems appropriate to recognize this variation pattern at the rank of subspecies. The two subspecies may be distinguished using McVaugh's (1945b) key to species.

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